

Is the Time-Delay Signal in Bose-Einstein Correlations a Signature for the Quark-Gluon Plasma at RHIC ?

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In 1996, D.H. Rischke and M. Gyulassy proposed to use the time-delay signal in Bose-Einstein correlations (BEC) as a signature for the possible formation of a quark-gluon plasma (QGP) in relativistic heavy-ion collisions. In particular, they suggested to measure the ratio of the transversal interferometry radii, R_{out}/R_{side} , which can be obtained by fitting experimental BEC data with a parametrization introduced by G. Bertsch et al. in 1988. The transverse radius parameter R_{out} has compared to the transverse radius parameter R_{side} an additional temporal dependence which should be sensitive to a prolonged lifetime of a fireball, in case a QGP was formed in a relativistic heavy-ion collision. In my presentation, I am going to revisit the above made considerations by addressing various possible scenarios for hadron spectra (single and double inclusives) for Pb+Pb collisions at CERN/SPS beam energies and for Au+Au collisions at BNL/RHIC beam energies, respectively, within a relativistic *true* hydrodynamic framework (i.e., HYLANDER-C). I claim, that the time-delay signal in Bose-Einstein correlations *is not* a signature for the possible formation of a QGP, and I am going to explain why this is the case.

Contents:

1. **QGP Stall**; and some further remarks on **Bose-Einstein Correlations (BEC)**.
2. relativistic **Hydrodynamics** and the **Equation Of State (EOS)** of nuclear matter.
3. from **CERN / SPS** to **BNL / RHIC**:
examples for **E dN/dp** and **BEC** spectra.
4. **my Predictions** for RHIC regarding the **QGP Stall**.

HBT - A Signature for QGP ?

The ratio of the **transverse** interferometry radii
 $R_{\text{out}} / R_{\text{side}}$ is a function of the **excitation** energy
density, due to **D.H. Rischke, et al.**

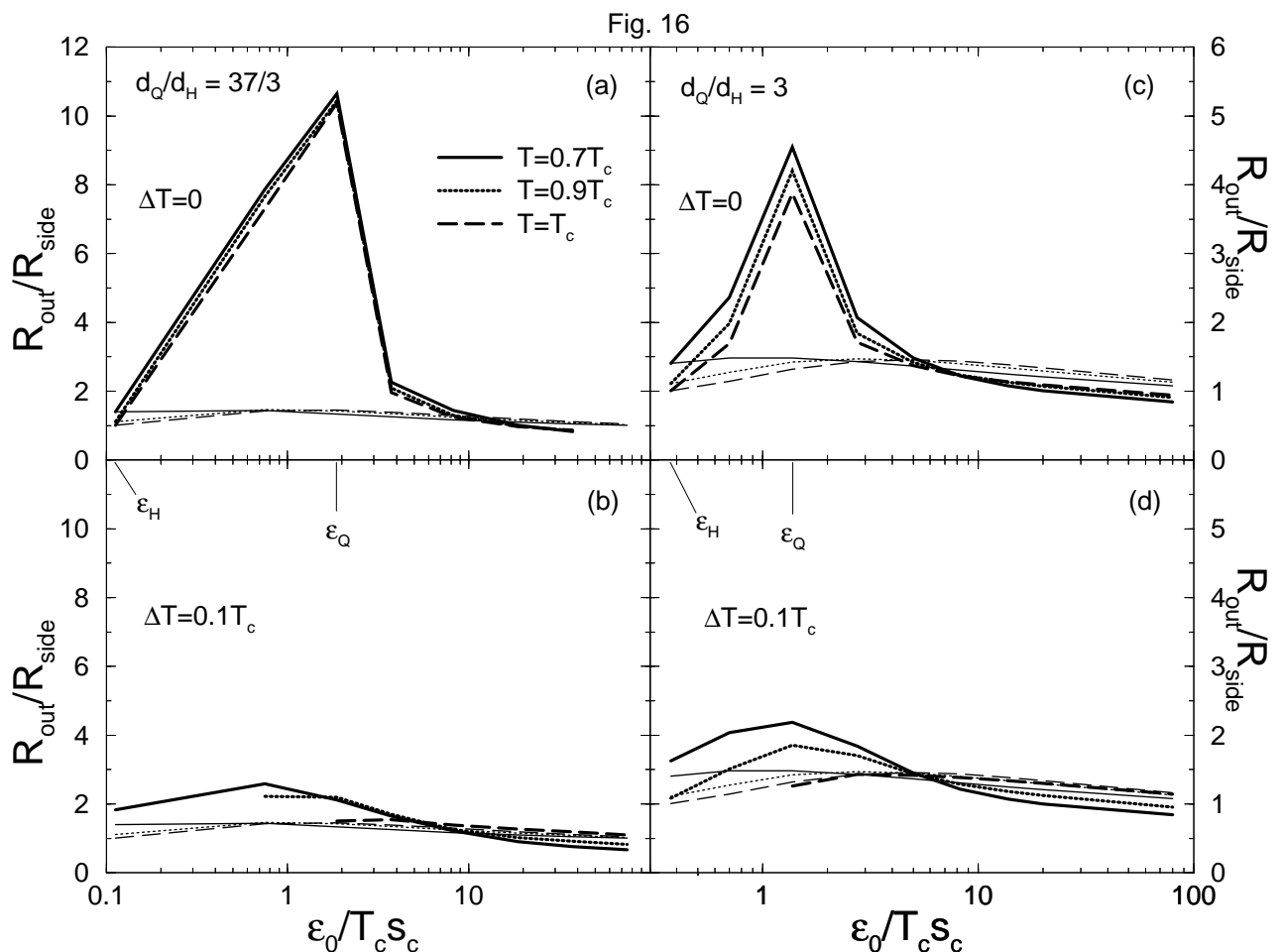


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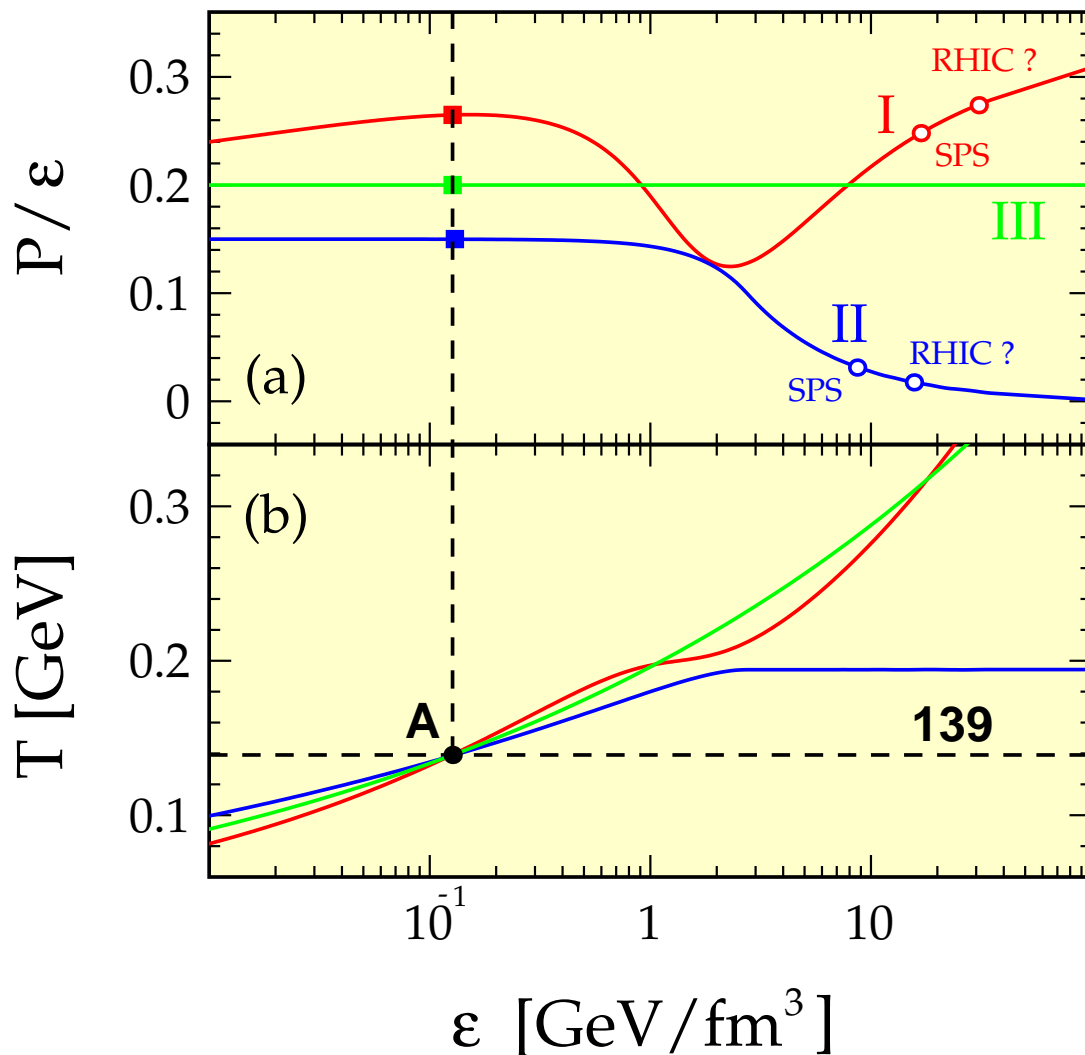
D.H. Rischke, M. Gyulassy, Nucl. Phys. A608 (1996) 479.

Hydrodynamics and EOS

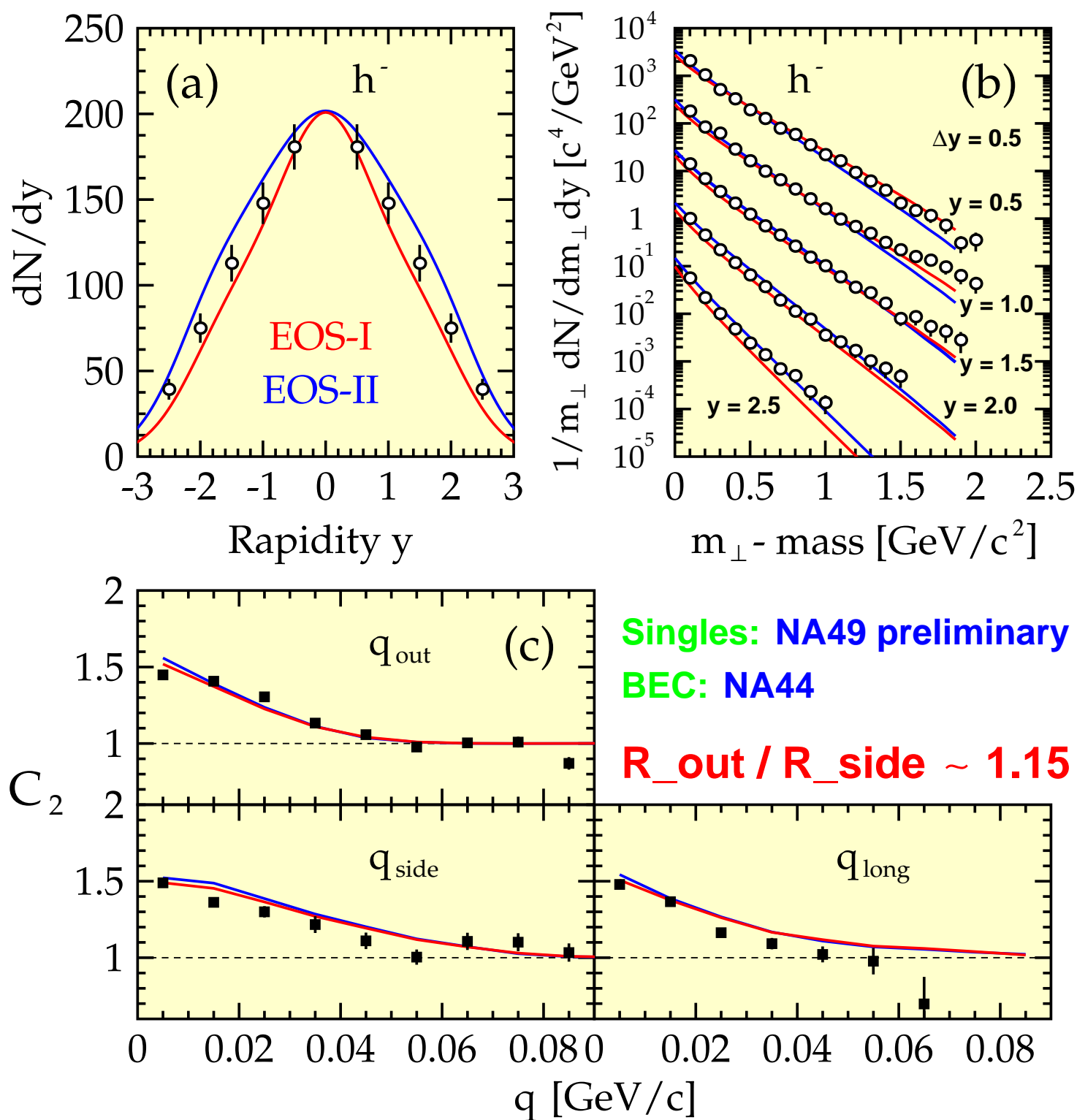
1. fully-fledged **Hydrodynamics** is **constrained**.
2. effective **Softness** determines m_{\perp} spectra **slopes**.
3. **BEC** is mostly determined by $T_f(\varepsilon_f)$.

B.R. Schlei, D. Strottman, N. Xu, Phys. Rev. Lett. 80 (1998) 3467.

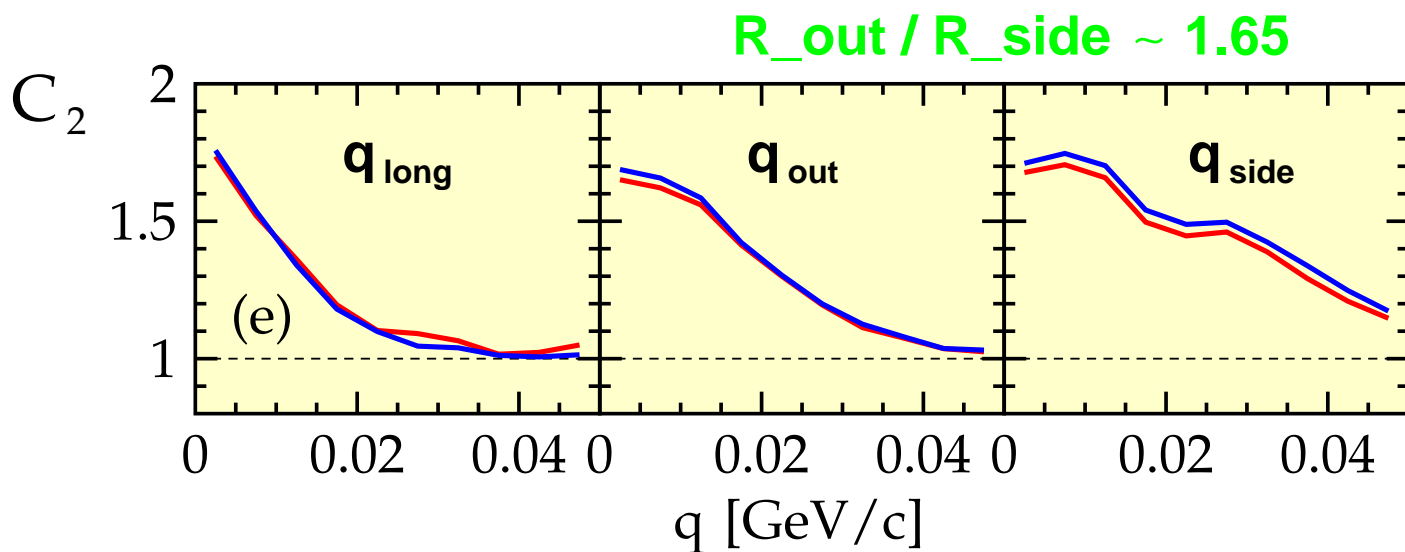
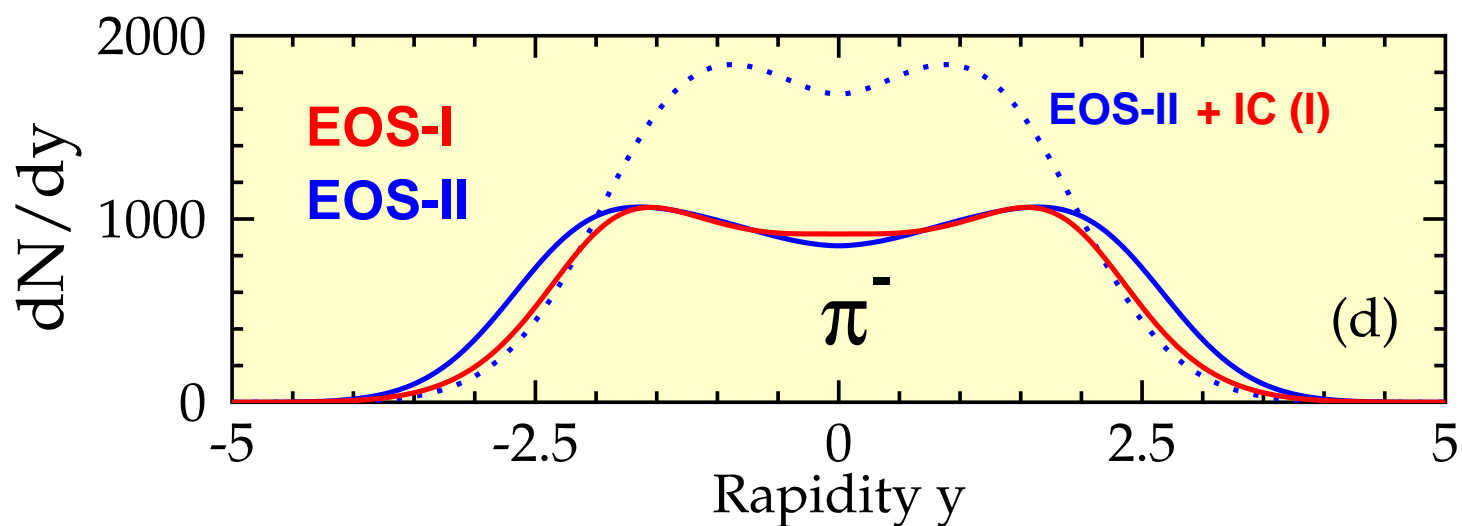
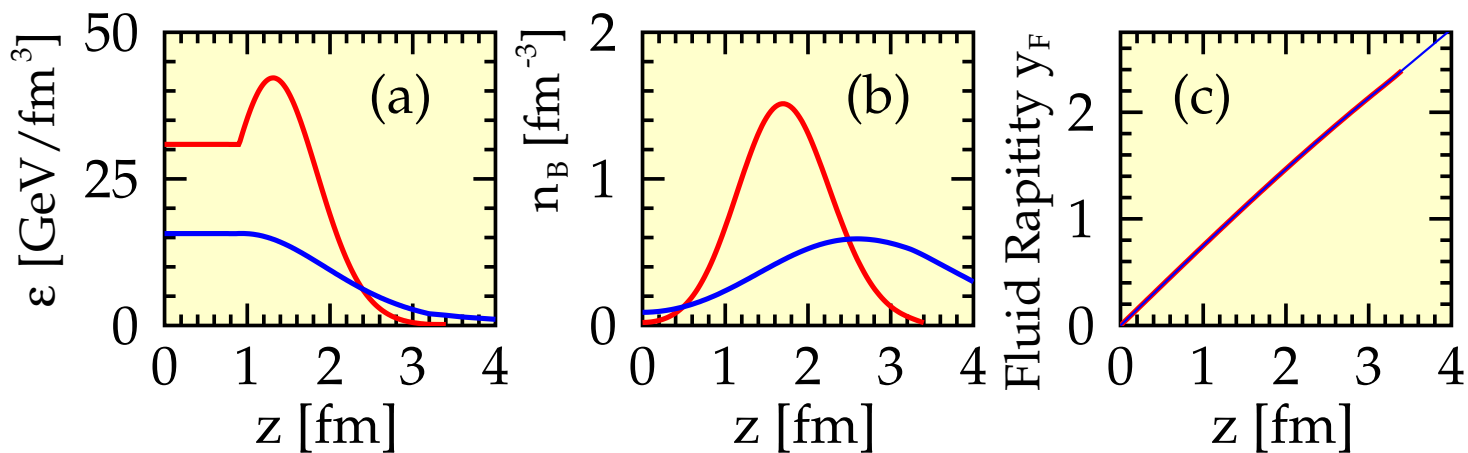
B.R. Schlei, CF'98 Proceedings; B.R. Schlei et al., LA-UR-98-4184.



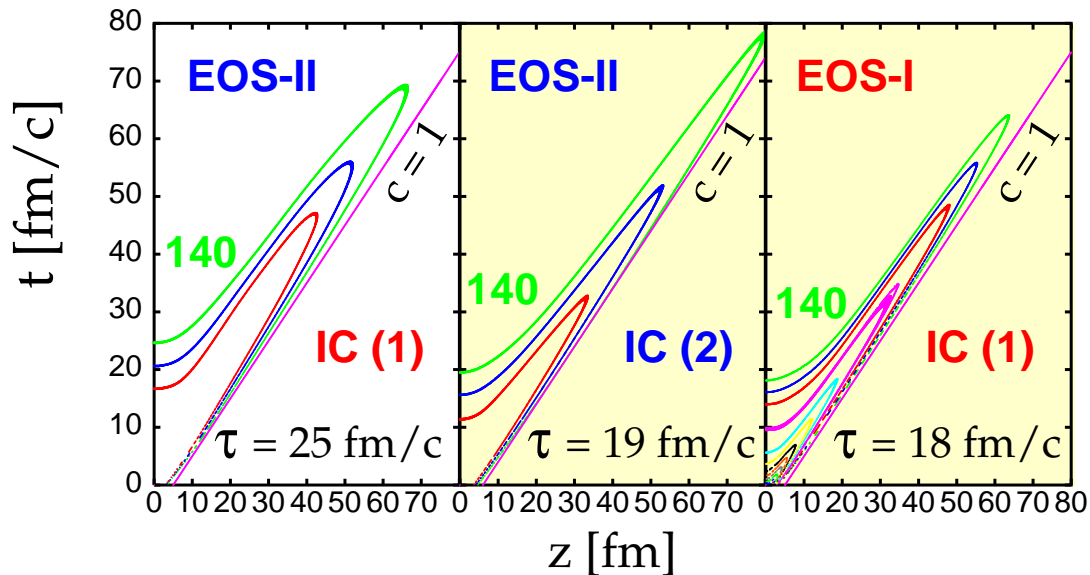
Earlier Results: CERN / SPS



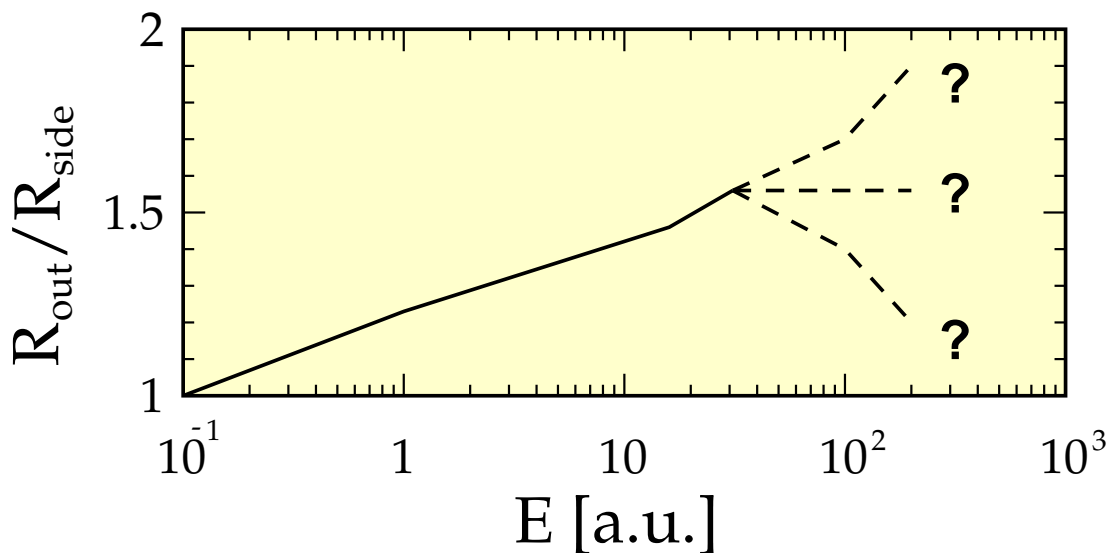
HYLANDER-C @ "RHIC ?"



Analysis and Conclusions



1. similar $E \, dN/dp$ leads to similar space-time geometry through adjustment of initial conditions.
2. $R_{\text{out}} / R_{\text{side}}$ changes with initially achieved ε_0 .



!!! BEC are not a QGP signature !!!